UNIVERSITÀ DEGLI STUDI DI MILANO

Corso di Laurea in Industrial Chemistry

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STUDIES ON THE COSTITUENTS OF SWEET PEPPER (SENISE PEPPER PGI) SUBJECTED TO DIFFERENT DRYING TECHNIQUES

This Master Thesis was carried out in collaboration with CREA IAA - Milano (Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria - Unità di ricerca per i processi dell'industria agroalimentare) as a part of the research project "Drying, Juices and Jams of **Or**ganic**F**ruit and **V**egetables: Whathappens to **De**sired and **Non-De**sired compounds?"(acronimo "FaVOr-DeNonDe") funded by CORE-Organic.

At the origin of this project there is an issue of great relevance, that is the quality of products derived from industrial processing of fruit and vegetables from organic farming, particularly in the case of some local varieties for which small processing plants are used. Specifically, the goal of Favor-DeNonDe project is tackle the following problems:

- The presence of positive compounds (desired, as taste active compounds) and negative (undesirable) in the products arising from small productive chains, for example those typical of local production;
- the influence that most modern processing technologies able to use more "mild" conditions with respect to the traditional ones have on the quality of the end product.

The Senise pepper is characteristic of the Lucan culinary tradition and has been awarded the Protected Geographical Indication (PGI). Powder of Senise pepper dried is in fact widely utilized in the cuisine of Basilicata to enhance and enrich the flavor of traditional dishes, and its use is widespread all over Italy. This property is attributed to the presence of components capable of acting as a 'flavor enhancers', *i.e.* to intensify the flavor of the other components of food.

Objective this thesis is to identify and isolate the molecules responsible for these effects as well as to characterize the components of Senise pepper PGI. With this aim in mind, different

samples of Senise pepper: 1) lyophilized from fresh product; 2) conventionally dried; 3) dried with a new type of dryer that uses solar panels; 4) dried under the sun were compared. The fruits analyzed all belong to the variety of Senise and come either from the Production and Marketing Cooperative of Red Pepper of Senise IGP, and from the experimental fields of the CREA-ORL (Centro di Ricerca Agroalimentare-Unità di Ricerca per l'Orticoltura) of Montanaso Lombardo (LO) and Battipaglia (SA). All samples were extracted with solvents of increasing polarity. We focused our attention on the methanol extracts which were found to be the most abundant and most enriched in different components. They were separated by means of a combination of chromatographic methods and fractions submitted to spectroscopic analysis (LC-MS, 1D/2D NMR) to determine the chemical structures of the taste-active components.

It is well known that the reaction of reducing sugars with amino acids and proteins, referred to as the Maillard reaction, is chiefly responsible for the development of unique aromas and tastes during thermal processing of foods. A number of model Maillard reaction were carried out under different experimental conditions and the resulting products compared with those present in pepper extracts.